Joint Non-Lethal Weapons Program

Non-Lethal Human Effects Fact Sheet

http://jnlwp.defense.gov

What are they?

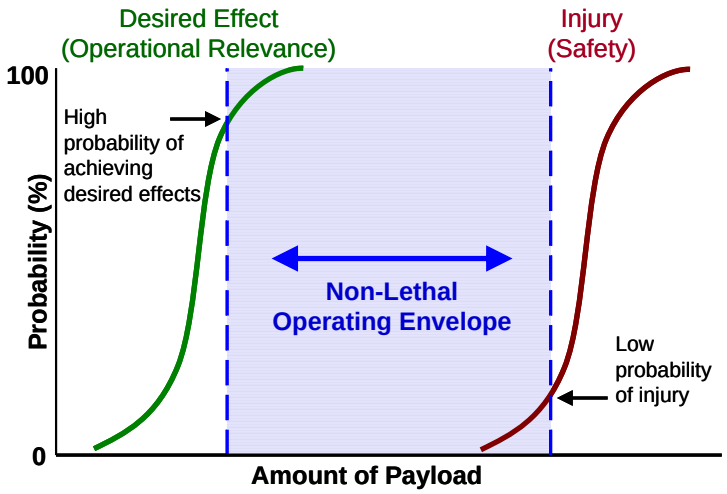
Non-lethal human effects are the physiological and behavioral responses produced by non-lethal weapons employment. Non-lethal human effects research identifies risk of permanent injury and characterizes the technology dependent limits of the non-lethal weapons "operating envelope." This process ensures the development and fielding of non-lethal weapons capabilities that are both safe and effective.

Human effects are key to the development of non-lethal weapons tactics, techniques, and procedures; they provide operational commanders with the understanding of risk to support informed employment decisions. Knowledge gained and products developed through human effects research also transition to the warfighter through extensive non-lethal training.

How are they characterized?

The Joint Non-Lethal Weapons Program (JNLWP) strives to develop non-lethal weapons through effects-based design, where promising new technologies are designed and developed based on non-lethal human effects. The JNLWP adopted the Human Effects Risk Characterization framework, an approach based on the National Academy of Sciences framework for risk assessment, to characterize the intended and unintended effects of non-lethal weapon technologies and payloads. The Human Effects Risk Characterization process establishes the baseline human effects understanding for a particular technology/payload, identifies knowledge gaps, and facilitates communication among human effects researchers, material developers, and non-lethal weapon operators.

When commercial off-the-shelf non-lethal weapon technologies are considered for non-lethal mission application, human effects assessments are conducted to identify the technology's anticipated physiological responses and risk of significant injury to the target, bystander, and operator. This includes understanding any possible collateral effects with the use of this non-lethal weapon.



Non-Lethal Weapons Operating Envelope

Non-lethal human effects are further characterized through assessments of operational relevance of non-lethal weapon technologies and payloads. Assessments are achieved with a combination of literature research, analytical and statistical analyses, and focused human effects and effectiveness experiments. The purpose of this type of developmental testing is to understand human behavioral response to non-lethal weapon stimuli. This understanding is important because non-lethal weapons are viable operational solutions only if their application elicits a desired response and has minimal risk of significant injury. This area between effect and risk of significant injury is the operating envelope developed using dose response curves. All JNLWP-sponsored research is conducted in accordance with federal regulations and Department of Defense policy.

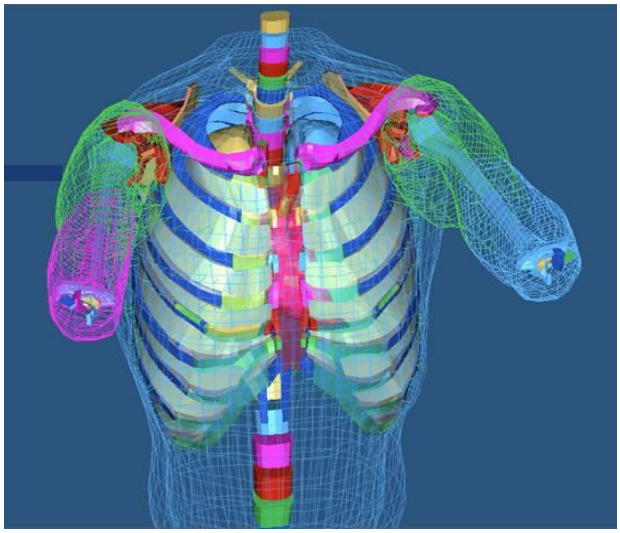
Human Effects Models

Human effects models are also used to characterize and assess non-lethal weapon systems. Non-lethal human effects models are developed from dose-response relationships generated by experimentation and from the refinement of existing models for non-lethal weapon application. Primary non-lethal human effects models include the Advanced Total Body Model for blunt impact injury assessment and the Optical Effects Model for broadband optical effects analysis.

Non-Lethal Human Effects

The non-lethal human effects models support risk assessments, effects-based design of emerging non-lethal technologies, design optimization of existing non-lethal weapons and payloads, and non-lethal weapons training.

Non-lethal human effects model development continues through the Human Effects Modeling Analysis Program. Efforts continue to validate and verify current models, as well as to interface the various capabilities as a non-lethal human effects suite of models. Additionally, future model development will include behavioral outcomes displayed in a modeling, simulation, and gaming environment.



Advanced Total Body Model

Review Boards

Following the recommendations of a 2001 National Academy of Sciences review of non-lethal weapon research and development, the JNLWP has established two human effects review boards to facilitate non-lethal human effects review, interpretation, and recommendation. These bodies provide guidance to program managers and material developers to help ensure that emerging non-lethal weapon technologies meet mission needs while minimizing the risk of injury.

The JNLWP Human Effects Review Board was established to independently review non-lethal human effects research and analyses associated with specific non-lethal weapon systems or technologies.

The Human Effects Review Board consists of representatives from the Offices of the Services' Surgeons General, the Medical Officer of the Marine Corps, and the Services' Safety Officers and includes legal, treaty and Department of Defense policy participation. The board provides non-lethal weapon program managers and milestone decision authorities with an independent measure of health risks and recommendations for mitigating potential risks.

The Human Effects Advisory Panel is another independent advisory panel supporting the joint non-lethal weapons community. Panel members consist primarily of non-governmental senior subject matter experts from academia, the medical community, and law enforcement. The panel provides an assessment of non-lethal human effects and makes risk mitigation recommendations to program managers prior to major acquisition program milestone decisions. The panel also reviews non-lethal human effects research plans, provides recommendations to program managers on how to address technical challenges, and addresses any open human effects issues identified by the Human Effects Review Board.

Similarly, the Technology Effectiveness Advisory Panel is an independent group of government and non-government personnel that conducts technical assessments of the counter-materiel or counter-personnel effectiveness of developmental non-lethal technologies and programs. The panel includes Service operators and test and evaluation engineers, as well as subject matter experts in bio-effects, weapons, and legal, treaty, and policy. Panel evaluations often focus on advanced concept non-lethal technologies, and they generally have broad applicability throughout other JNLWP projects.

Human Effects Center of Excellence

The Human Effects Center of Excellence was created in 2001 via memorandum of agreement between the Air Force Research Lab and the JNLWP. The center provides consultation and guidance to program mangers, as well as recommendations on laboratories and field activities best suited to execute human effects research. The Center also manages human effects assessments, non-lethal weapon safety and risk assessments, and risk characterizations.